

AMENDMENTS TO THE CLAIMS

1. (Currently amended) A semiconductor laser element,  
comprising:

a semiconductor laser region including a plurality of laser emission portions each having the same construction relative to one another and arranged side by side in a parallel array, each of said laser emission portions including an active layer for emitting light;

a multimode interference region including a first wave-guiding layer; ~~wherein one end of the first wave-guiding layer is spaced by an equal length or distance in an optical direction from the active layers of the plurality of laser emission portions so as to provide an equal passage of time of light thereto from the active layers; and~~

an input waveguide region located between the semiconductor laser region and the multimode interference region, said input waveguide region including a plurality of wave-guiding portions where all the wave-guiding portions are equal length in an optical direction; and

an output waveguide region including a second wave-guiding layer, the second wave-guiding layer being optically coupled to an

opposite end of the first wave-guiding layer of the interference region.

2. (Cancelled) A semiconductor laser element according to claim 1, wherein the semiconductor laser region includes a plurality of laser emission portions arranged in a predetermined array.

3. (Previously Presented) A semiconductor laser element according to claim 1, wherein the semiconductor laser region, the multimode interference region, and the output waveguide region are provided on a same semiconductor substrate.

4. (Original) A semiconductor laser element according to claim 3, further comprising:

a first electrode provided on a lower surface of the semiconductor substrate; and

a second electrode provided at least on a upper surface of the semiconductor laser region.

5. (Withdrawn) A semiconductor laser element according to claim 4, further comprising a third electrode provided over at least one of the output waveguide region and at least a portion of the multimode interference region.

6. (Withdrawn) A semiconductor laser element according to claim 5, wherein a bias voltage is applied to the third electrode.

7. (Withdrawn) A semiconductor laser element according to claim 4, wherein the second electrode extends to at least a portion of an upper surface of the multimode interference region.

8. (Withdrawn) A semiconductor laser element according to claim 3, further comprising:

a first electrode provided on a lower surface of the semiconductor substrate; and

a fourth electrode provided at least on a upper surface of the multimode interference region.

9. (Previously presented) A semiconductor laser element according to claim 1, wherein the active layer of the plurality of laser emission portions, the first wave-guiding layer of the multimode interference region, and the second wave-guiding layer of the output waveguide region are integrally formed of a same type of semiconductor material.

10. (Previously presented) A semiconductor laser element according to claim 1 and additionally comprising,

an input waveguide region located between the semiconductor laser region and the interference region, and including a plurality of mutually spaced apart substantially equal length third wave-guiding layers for optically coupling the active layers of the plurality of laser emission portions and the first wave-guiding layer of the multimode interference region.

11. (Original) A semiconductor laser element according to claim 10, wherein the plurality of active layers, the first wave-guiding layer, and the plurality of the third wave-guiding layers are integrally formed of the same material.

12. (Previously presented) A semiconductor laser element according to claim 10, wherein the first wave-guiding layer and the plurality of third wave-guiding layers are comprised of low optical absorption material.

13. (Original) A semiconductor laser element according to claim 12, wherein the first wave-guiding layer and the plurality of third wave-guiding layers are formed of AlGaAs.

14. (Original) An electronic device comprising the semiconductor laser element of claim 1, wherein the electronic device supplies a modulation signal to the semiconductor laser element.

15. (Cancelled) A semiconductor laser element, comprising:

a semiconductor laser region including at least one laser oscillation portion having an active layer which performs laser oscillation; and

a multimode interference region including a first wave-guiding layer, one end of the first wave-guiding layer being optically coupled to the active layer in the at least one laser oscillation portion,

wherein the active layer in the at least one laser oscillation portion, and the first wave-guiding layer, are integrally formed.

16. (Cancelled) A semiconductor laser element according to claim 15, wherein the semiconductor laser region includes a plurality of laser oscillation portions arranged in a predetermined array.

17. (Cancelled) A semiconductor laser element according to claim 15, wherein the semiconductor laser region, and the multimode

interference region are provided on the same semiconductor substrate.

18. (Cancelled) A semiconductor laser element according to claim 15, wherein an output waveguide, from which laser light is emitted, is formed integrally with the multimode interference region.

19. (Cancelled) A semiconductor laser element according to claim 15, wherein:

the semiconductor laser region includes a plurality of laser oscillation portions; and

the semiconductor laser element further includes a plurality of input waveguides which have a plurality of second wave-guiding layers for optically coupling a plurality of active layers of the plurality of laser oscillation portions and the first wave-guiding layer provided between the plurality of active layers and the first wave-guiding layer.

20. (Previously presented) A semiconductor laser element according to claim 28, wherein:

a dielectric film is provided between the plurality of active layers of the laser region and the plurality of second wave-guiding layers of the input waveguide region; and

wherein the plurality of active layers of the laser region and the plurality of second wave-guiding layers of input waveguide regions are optically coupled to each other through the dielectric film.

21. (Previously presented) A semiconductor laser element according to claim 28, wherein the first wave-guiding layer and the plurality of second wave-guiding layers are comprised of the same material having a low light absorption.

22. (Previously presented) A semiconductor laser element according to claim 21, wherein the first wave-guiding layer and the plurality of second wave-guiding layers are comprised of AlGaAs.

23. (Previously presented) A semiconductor laser element according to claim 28, wherein each of the plurality of second wave-guiding

layers of the input waveguide region has a predetermined equivalent refractive index.

24. (Previously presented) A semiconductor laser element according to claim 28, wherein each of the plurality of second wave-guiding layers has a predetermined width.

25. (Previously presented) A semiconductor laser element according to claim 24, wherein a manufacturing accuracy in the width of each of the plurality of second wave-guiding layers with respect to the predetermined width is 0.05  $\mu\text{m}$  or smaller.

26. (Previously presented) A semiconductor laser element according to claim 28, wherein the geometric pattern of the plurality of second wave-guiding layers is made by a reduction exposure method.

27. (Previously presented) An electronic device including the semiconductor laser element of claim 28, which outputs a modulated signal to the semiconductor laser element.



28. (Currently amended) A semiconductor laser element, comprising:

a semiconductor laser region including a plurality of laser oscillation portions each having the same construction relative to one another, arranged side by side, and having a common modulation electrode traversing all of the laser emission portions for operating said laser emission portions in a single mode, each of said laser ~~oscillation~~-emission portions also having an active layer which performs laser operations at a same wavelength;

a multimode interference region including a first wave-guiding layer coupled to said laser oscillation portions via an input waveguide region including a plurality of parallel equal length waveguides having respective second wave-guiding layers where all the waveguides are equal in length in an optical direction;

an output waveguide region including a third wave-guiding layer coupled to said second wave-guiding layers;

wherein the active layer of the plurality of laser oscillation portions, the first wave-guiding layer of said multimode interference region, the second wave-guiding layers of the input waveguide region, and the third wave-guiding layer of the output waveguide region are formed on a common substrate.